Exam

Name_____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) The 1987 UN Commission on Sustainability first introduced the concept of _____ as a necessary focus for maintaining sustainability. 1) _____
A) cultural services
B) human population growth
C) human well-being
D) renewable energy
E) environmental sustainability

2) The current total world population has just passed _____. 2) _____
A) 8 billion B) 5 billion C) 7 billion D) 9 billion E) 6 billion

3) The law of energy and mass conservation states that _____. 3) _____
A) both energy and matter can be created and destroyed
B) energy and matter cannot be created or destroyed
C) energy can be created and matter destroyed
D) energy cannot be destroyed but matter can be created

4) Which of the following is *not* an abiotic factor? 4) _____
A) bacteria
B) carbon and nitrogen levels
C) sunlight
D) rainfall
E) temperature

5) An ecosystem is best defined as _____. 5) _____
A) the total population of a specific kind of plant, animal, or microbe and all members of which do or potentially can interbreed and produce young
B) a regional grouping of plants, animals, and abiotic factors
C) a grouping of plants and animals that interacts with one another in a way that causes the grouping to die
D) abiotic factors affecting a grouping or plants, animals, and organisms trying to survive in a given area
E) all the organisms and their physical and chemical environment within a specific area where energy and matter influence the distribution and abundance of organisms present

6) Which of the following is *not* a principle of Ecosystem function? 6) _____
A) Ecosystem change is inevitable and essential.
B) Ecosystems are always open to gains and losses of matter and energy.
C) Ecosystem's processes are self-regulated by interactions among their living and nonliving components.
D) Matter and energy are neither created nor destroyed.
E) Ecosystems have distinct boundaries that are influenced by the abiotic factors in the ecosystem.

7) A hypothesis can best be described as _____. 7) _____
A) a proven fact
B) an explanation that has been tested many times
C) a comparison between groups with an explanation for differences
D) a proposed explanation that can be tested
E) the science of asking questions and finding concrete answers

8) All the organisms and their physical and chemical environment within a specific area best describe _____. 8) _____
A) ecological communities
B) ecosystems
C) the biosphere
D) populations
E) biomes

9) Sustainable use of resources requires _____. 9) _____
A) an understanding of rate of resource renewal and ability to manage rate of use
B) an understanding of ecosystem models
C) a thorough understanding of the scientific method
D) knowledge of all nonrenewable resources
E) knowledge of all finite resource locations

10) The ecosystem boundary of a drainage basin can be defined by _____. 10) _____
A) the amount of water flowing into the basin from a mountain
B) mountains, hills, and valleys that determine where the water flows
C) the rivers that divide the basins between counties, cities, and states
D) the streams that flow into the basin
E) local legislative decisions designed to clarify jurisdiction of the ecosystem

11) A *key factor* in the ability of ecosystems to provide ecosystem services is _____. 11) _____
A) the maintenance of a high level of diversity of species
B) a sustainable energy cycle
C) the presence of essential abiotic factors
D) the presence of both renewable and nonrenewable resources
E) a steady rate of growth of the ecosystem

12) What is one barrier that makes it difficult for scientists to forecast environmental changes? 12) _____
A) environmental conflict that leads to ecosystem sustainability
B) simplicity of ecosystems
C) unpredictable behavior of ecosystems that cause unpredicted environmental changes
D) the certainties of ecosystem function that humans ignore
E) the diversity of views based on cultural and religious differences

13) At virtually any level of use, nonrenewable resources can be _____. 13) _____
A) converted to nonmetallic minerals
B) replenished once depleted
C) converted to renewable ones
D) recycled or reused
E) exhausted or depleted

14) In human-dominated ecosystems, which of the following features is often lacking? 14) _____
A) the presence of positive feedback systems
B) homeostatic regulation
C) the presence of sufficient human infrastructure
D) an ecosystem's ability to grow sufficient food
E) drought resistant regulation

15) Sustainable companies such as DIRTT measure success by the triple bottom line, which includes _____, people, and profit. 15) _____
A) prosperity
B) popularity
C) petroleum
D) professionalism
E) planet

16) Environmental science is *best* described as _____. 16) _____
A) studying the physical and chemical aspects of an environment
B) focusing on organism relationships within an ecosystem
C) focusing on renewable resource sustainability
D) studying ecosystem sustainability and destruction
E) studying all aspects of an environment

17) Negative feedback processes tend to function within ecosystems to _____. 17) _____
A) cause further ecological destruction.
B) cause ecological relationships to flourish
C) stabilize the ecosystem
D) reinforce harmful changes
E) cause ecological relationships to disintegrate

18) As human population and demands for resources have changed, our definition of sustainability has also changed. One hundred and fifty years ago, human resource use was *largely* determined by _____. 18) _____
A) human needs or desires
B) the necessity to avoid human conflict
C) the need for balancing multiuses/demands for a resource
D) consideration of human justice
E) the understanding of resource supply

19) Ecosystems are connected by _____. 19) _____
A) the flow of energy and matter through the ecosystem
B) the movement of pollutants between ecosystems
C) the essential flow of water through the ecosystem
D) individual species competing for space with other species in the ecosystem
E) energy cycling and nutrient flow

20) Throughout any introductory examination of ecosystems and environmental sustainability, the importance of human population numbers is cited. Currently, the world and U.S. populations are closest to _____. 20) _____

A) 7 billion; 300 million
B) 7 billion; 500 million
C) 9 billion; 400 million
D) 3.5 billion; 300 million
E) 7 billion; 200 million

21) What ecosystem services from U.S. national forests had the *greatest* demands placed on them following World War II and the country's rapid population growth? 21) _____

A) soil formation and wilderness protection
B) soil formation and agriculture
C) grazing, recreation, and timber resources
D) food, fiber, and plant growth
E) grazing and agriculture

22) What makes up an ecosystem? 22) _____

A) energy and matter and the organisms competing for resources in the ecosystem
B) living and nonliving parts and energy movement created by the sun
C) energy and matter and the organisms functioning apart
D) living and nonliving parts and the processes that disconnect them
E) living and nonliving parts and the processes that connect them

23) Which of the following is *not* considered biota? 23) _____

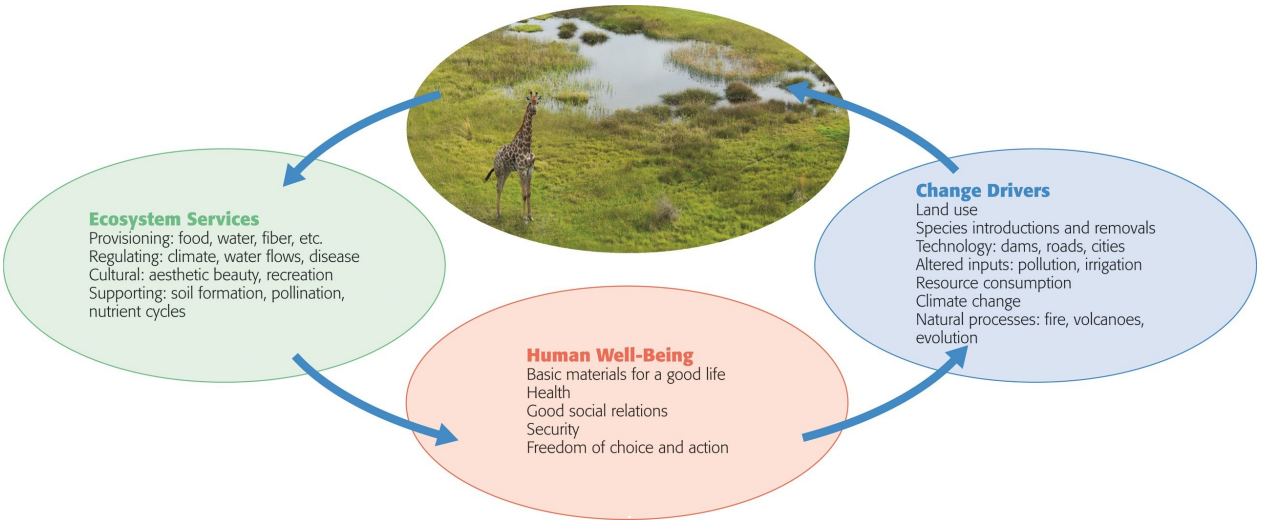
A) plants B) animals C) fungi D) water E) bacteria

24) Resources are _____. 24) _____

A) available in ample quantities
B) finite
C) infinite
D) used at a slow rate so that they will last forever
E) available in sufficient quantities to sustain all of our futures

25) What is required to be considered sustainable use of resources? 25) _____

A) understanding the rate of exhaustion and the ability to manage the rate of the use
B) understanding that resources are infinite
C) understanding that resources are finite
D) understanding the rate of renewal and the ability to manage the rate of the use
E) understanding ecosystem function in relation to resource use



26) What are examples of provisioning ecosystem services? 26) _____

A) food, water, and fiber
B) aesthetic beauty and recreation
C) soil formation and nutrient cycles
D) climate, water flow, and disease
E) pollination and chlorophyll

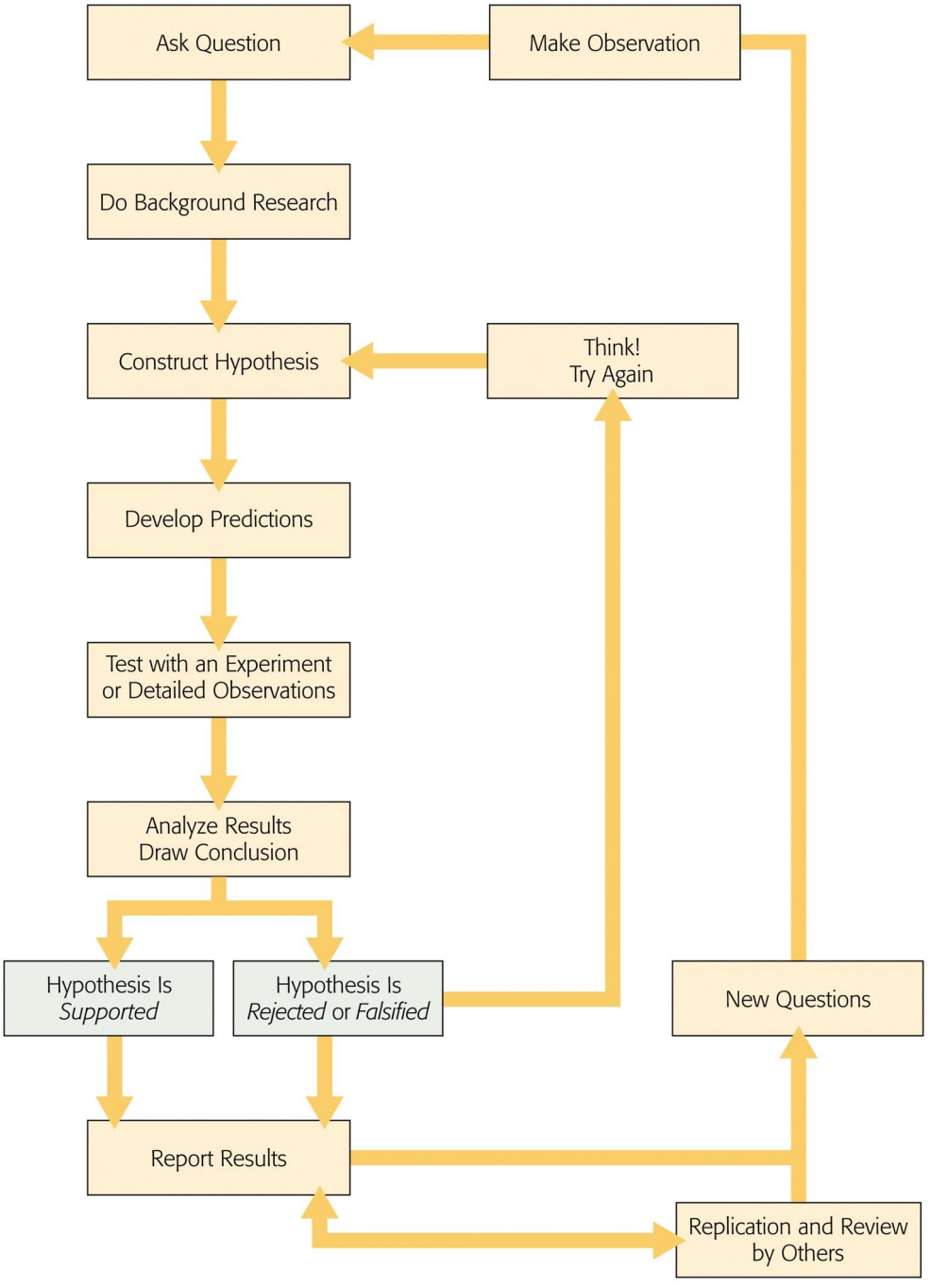
27) Regulating ecosystem services are ways that ecosystems control important conditions and/or processes such as _____. 27) _____

A) climate, water flow, and disease
B) aesthetic beauty and recreation
C) food, water, and fiber
D) soil formation and nutrient cycles
E) pollination and chlorophyll

28) A *cultural* ecosystem service might be _____. 28) _____

A) the beauty or inspiration provided by a forest
B) good health access for populations in a community
C) providing food to the malnourished
D) ensuring flow of traffic in and out of a city
E) constructing a "green" building

29) What is the end product of the scientific method for a particular question? 29) _____



A) scientific observations
B) peer review and publication
C) drawing conclusions
D) hypothesis testing
E) hypothesis construction

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

30) Match each term with the correct description. 30) _____

I. Ecosystem services
II. Provisioning services
III. Regulating services
IV. Cultural services
V. Supporting services

A. Basic ecosystem processes that are needed to maintain other services
B. The multitude of resources that ecosystems supply to humans
C. Food, water, and air we breathe
D. Spiritual and recreational benefits that an ecosystem provides
E. Ecosystem control of climate, flows of water, and absorption of pollutants

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Read the scenario and answer the accompanying question(s).

Sustainable management requires us to examine the "big picture" of an ecosystem's context, even though we may not understand every piece and process in that ecosystem. Systems thinking recognizes and addresses the essential connections between the pieces of any system to be analyzed.

31) Which of the following environmental examples represents systems thinking? 31) _____
A) planting grass for cattle to feed on in desert regions
B) emission control devices on California automobiles
C) studying the behavior of a global invasive species
D) undertaking a long-term study of Lake Michigan ecology
E) examining the beetle life cycle that is posing a threat to local forests

32) Ecosystem services are often classified into four *different* categories that include provisioning services (supplying us with food, air, and water), as well as _____. 32) _____
A) aesthetic, ecological, and regulating services
B) regulating, cultural, and supporting services
C) aesthetic, spiritual, and recreational services.
D) regulating, sustainable, and homeostatic services
E) aesthetic, cultural, and sustainable services

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

33) Assuming that a city wishes to manage its water supply in a sustainable manner, describe/explain two specific factors that must be considered in order to accomplish this.

34) In the course of one day, a human experiences several dozen ecosystem services other than the essential provisioning services supplying us with food, water, and the air we breathe. Explain three additional ecosystem services that are essential to maintaining life on Earth.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

35) Hetch Hetchy provides the residents of San Francisco with _____. 35) _____
A) wilderness habitats
B) water for drinking
C) forest for recreation
D) lakes for fishing
E) miles of biking and hiking paths

36) The Modern Era's views on the relationship of humans and the environment can be described as _____. 36) _____
A) the obsession with material goods that broke the connection between humans and nature
B) reconciliation of our activities with the inescapable laws of the natural world
C) evolutionary change that described the connections between organisms and their environment
D) opportunities for fewer connections between humans and nature
E) human impacts on ecosystems differ significantly from natural disturbances

37) Which of the ethical traditions best describes the building of the Hetch Hetchy Reservoir as right because it benefited a large number of people? 37) _____
A) environmental ethics
B) utilitarianism
C) duty-based ethics
D) virtue ethics
E) consequence-based ethics

38) The domestication of plants and animals allowed humans to alter ecosystems for their benefits. Which of the following is an example of a human benefit that resulted from ecosystem change? 38) _____
A) Crop production increased and more people had food to eat.
B) Grasslands were destroyed and replaced with forests.
C) Crop production increased as a result of more plants competing for the same land space.
D) Grasslands were destroyed and predator insects were destroyed.
E) Crop production decreased as natural habitats were replaced.

39) During the 19th century, as populations grew and urban environments expanded, humans had less exposure to _____. 39) _____
A) natural environments
B) animals
C) air pollutants
D) water
E) chemicals

40) Gifford Pinchot, first head of the U.S. Forest Service, advocated the conservationist view of nature. This view promoted _____. 40) _____
A) resource use in a sustainable manner to provide the greatest benefit for the greatest number of people
B) a wilderness and ecocentric approach to public resource use
C) resource use in a sustainable manner with an ecocentric focus
D) a deep ecology approach to public resource use
E) a biocentric approach to public resources

41) Natural wilderness should be protected regardless of the needs of humans is an example of the _____ point of view. 41) _____
A) ecologist
B) preservationist
C) conservationist
D) economist
E) environmentalist

42) The animal rights movements in society evolved from _____. 42) _____
A) biocentric ethics
B) anthropocentric ethics
C) environmental ethics
D) virtue ethics
E) ecocentric ethics

43) Rachel Carson's book, _____, pointed out the dangers posed to the natural environments and humans by pesticides. 43) _____
A) *Nature*
B) *Man and Nature*
C) *Walden*
D) *The Population Bomb*
E) *Silent Spring*

44) DDT was originally intended to kill _____. 44) _____
A) aphids
B) corn insects
C) plants
D) birds
E) mosquitoes

45) Environmental ethics is *best* defined as _____. 45) _____
A) studying the economic value of all living things in their environment
B) studying the moral relationships of humans to the environment and the environment's living organisms
C) studying the rightness and wrongness of human actions
D) actions taken by humans in the environment in which they live that have impact
E) the extrinsic value placed on people, organisms, and objects in the environment

46) Environmental justice seeks to _____. 46) _____
A) ensure that legal boundaries are adhered to when environmental disputes arise
B) ensure that people are treated fairly regardless of race, gender, or economic status in the management of natural resources
C) ensure the sound management of the environment
D) ensure that ecocentric ethics are applied to the environment
E) ensure that anthropocentric ethics are applied to the environment

47) A subsistence economy is one that _____. 47) _____
A) meets is environmental needs while causing ecosystem destruction
B) meets its environmental need by over fishing lakes and rivers
C) meets its environmental needs without accumulating wealth
D) purchases resources for immediate use
E) purchases goods and services from others

48) A subsistence farmer might _____. 48) _____
A) allow production and consumption of goods and services to take place in a market system
B) sell goods they catch and grow
C) barter or trade goods they grow
D) accumulate a surplus of goods to sell for financial gain
E) buy commodities from others

49) The price consumers are willing to pay for a resource that may be limited depends on _____. 49) _____
A) their ability to pay more than someone else
B) their access to the resource in their community
C) how much they can afford at a time the resource is limited
D) their perceived need for the resource
E) how much of the resource is remaining to purchase

50) When a commodity is in short supply, the cost _____. 50) _____
A) remains the same
B) decreases
C) goes up
D) is near the cost of production
E) is lower in areas with better access

51) The difference between the cost to produce a commodity and its price in the marketplace is _____. 51) _____
A) economy of scale
B) economic value
C) opportunity cost
D) profit
E) discount rate

52) Cost per unit of a good or services decline as the level of production increases. This is described as _____. 52) _____
A) economy of scale
B) profit
C) discount rate
D) opportunity cost
E) economic value

53) The economic value of an ecosystem service can be measured by accessing the willingness to pay for the action to _____ them. 53) _____
A) preserve B) monitor C) conserve D) value E) recirculate

54) Which of the following issues would be addressed by a county's land use development office when making important environmental decisions? 54) _____
A) storage of nuclear wastes
B) controlling air pollution from automobiles
C) building of a landfill
D) building of a new gas station in the county
E) managing a national park

55) Gross domestic product is _____. 55) _____
A) the willingness of consumers to pay for ecosystem services
B) cost of services minus the economic value of enhancements or degradation to the environment
C) the total economic value of goods and services produced by a country
D) all the resources necessary to produce the ecosystem services
E) a measure of a country's economic standing

56) Most environmental policy is set by _____. 56) _____
A) the President
B) Congress
C) federal legislation
D) Supreme Court rulings
E) state and local governments

57) Individuals in Africa often share crop and livestock land with other families in their community. What happens to the land as a result of each family using an individual's approach to managing it? 57) _____
A) It is protected by laws.
B) It is often overexploited.
C) It is preserved from family to family and generation to generation.
D) It is managed sustainably for future farming.
E) It is preserved as a result of the importance of cultural heritage.

58) The constitutional basis for environmental justice is rooted in _____. 58) _____
A) equal protection for all citizens
B) public policy and governmental ethics
C) compensation to a land owner by the government when their property is needed for public use
D) ecological valuation of the ecosystem
E) environmental laws and legislative regulations

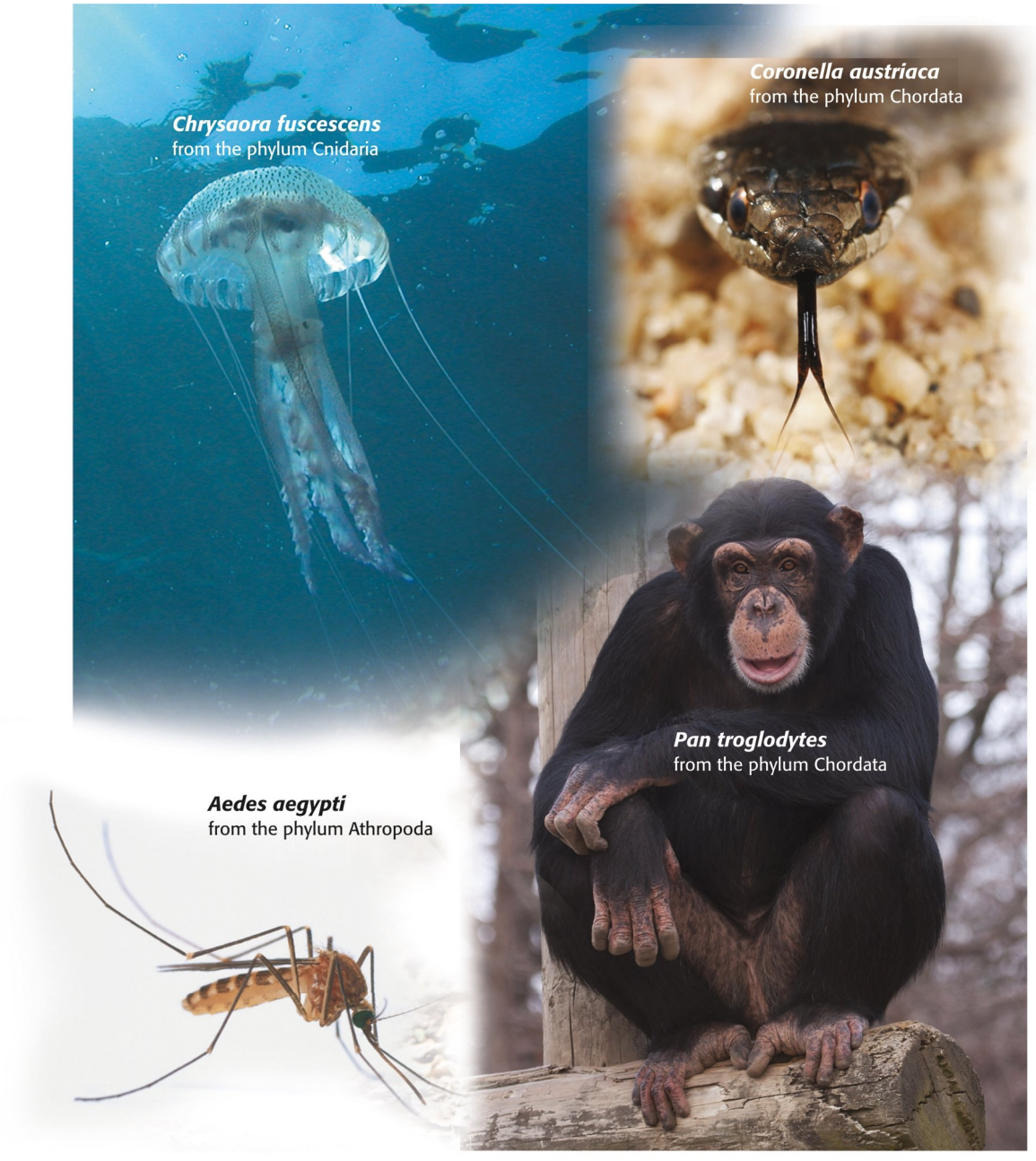
59) Which of the following agencies has significant influence on international environmental policy but no government representation or participation? 59) _____
A) The European Environment Agency
B) The Global Environmental Facility
C) The World Wildlife Fund
D) The United Nations
E) The World Trade Organization

60) U.S. environmental law and policy are influenced by the actions of _____. 60) _____
A) the executive branch
B) all three branches of government
C) the legislative branch
D) only the executive and legislative branches
E) the judicial branch

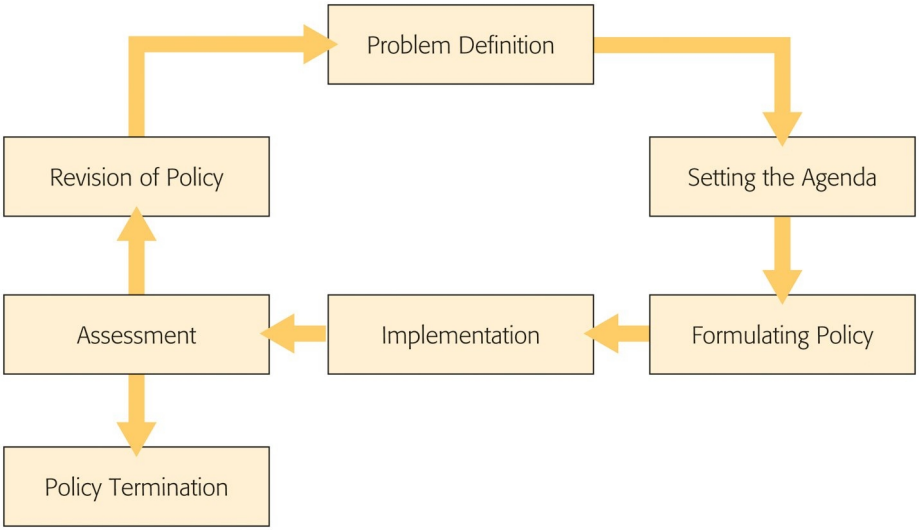
61) Natural capital is defined as all of Earth's resources that are necessary to produce _____. 61) _____
A) a safe habitat for endangered species
B) the ecosystem services that we depend on
C) environmental justice for all
D) a sustainable market
E) a profit

62) A grass root organization is attempting to preserve a stretch of forest that is being considered for purchase by a manufacturing plant. The organization's main strategy is to inform the nearby housing developments of the effect on their home values if the manufacturing plant goes versus the preserved forest. This approach is using _____. 62) _____
A) travel-cost valuation
B) market valuation
C) contingent valuation
D) scare tactic valuation
E) hedonic valuation

63) Some groups state that the primate shown in this photograph has economic value for humans via ecotourism. This primate would be referred to as having _____. 63) _____



A) individual value
B) ecological value
C) instrumental value
D) theological value
E) intrinsic value



64) What part of the policy-cycle determines who will deal with a particular issue and when? 64) _____
A) Implementation
B) Formulating Policy
C) Assessment
D) Problem Definition
E) Setting the Agenda

65) What part of the policy-cycle allows individuals or agencies to carry out the new activities and enforce the laws? 65) _____
A) Problem Definition
B) Formulating Policy
C) Setting the Agenda
D) Implementation
E) Assessment

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

66) Match each term with the correct description. 66) _____

I. Virtue ethics
II. Anthropocentric ethics
III. Biocentric ethics
IV. Ecocentric ethics
V. Duty-based ethics

A. Rightness or wrongness of actions should be determined by a set of rules or laws.
B. An action is right if it is motivated by virtues that include kindness, honesty, loyalty, and justice.
C. Defines right actions in terms of outcomes for human beings
D. Argues that the value of other living things is equal to the value of humans
E. Places value on communities of organisms and ecosystems

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Read the scenario and answer the following questions.

The widespread use of the pesticides DDT in the environment following World War II had major environmental impacts on the ecosystem. Human exposure to this pesticide continues today despite the ban of DDT use in the United States since the early 1970s. However, DDT continues to be manufactured in the U.S. and exported to many countries worldwide.

67) The approach to the manufacture and use of DDT worldwide is *best* described as _____. 67) _____
A) biocentric
B) ecocentric
C) focusing on economic externalities
D) focusing on deep ecological principles
E) anthropocentric

68) When analyzing the economic value of using DDT in the environment, the major criticism that environmentalists routinely cite is that _____ costs have not been fully considered. 68) _____
A) contingent valuation
B) internal
C) hedonic valuation
D) external
E) subsistence

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

69) Compare economic and ecological approaches to valuation of the environment.

70) Describe the three main environmental ethic approaches used to determine who or what has value in the Earth's biosphere.

71) There are often eight issues that can be debated when reflecting on environmental policy. They include:
1. government versus individual
2. competing public values
3. uncertainty and action
4. which level of government decides?
5. which government agency has jurisdiction?
6. protection against selfish actions
7. the best means to an end
8. political power relationships

Discuss at least two of the above issues, describing the challenges that each brings to developing environmental policy.

72) When measuring the wealth of a nation, explain the difference between gross domestic product (GDP) and genuine progress indicator (GPI).

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

73) The *most essential* compound needed to sustain life as we know it is _____. 73) _____
A) water
B) carbohydrates
C) ozone
D) carbon dioxide
E) oxygen

74) What is an element? 74) _____
A) two or more atoms held together by chemical bonds
B) a chemical that cannot be separated, but is limited in supply
C) a chemical that cannot be broken down or separated into other chemicals
D) a chemical that can be broken down or separated into other chemicals
E) one or more molecules held together by chemicals

75) What is the basic subunit of elements? 75) _____
A) molecules B) atoms C) neutrons D) electrons E) protons

76) Molecules are _____. 76) _____
A) atoms of an element
B) a chemical that cannot be broken or separated
C) positively charged particles
D) basic subunits of elements
E) two or more atoms held together by chemical bonds

77) Which is the most important molecule in the ecosystem? 77) _____
A) salt B) lead C) water D) oxygen E) nitrogen

78) Compounds are _____. 78) _____
A) molecules that have mass
B) molecules that are held together by atoms
C) molecules that are made of more than one element
D) atoms that are electrically charged
E) atoms that are radioactive

79) Cells and tissues of all organisms are made primarily of _____. 79) _____
A) water
B) cellulose
C) salt
D) hydrogen
E) carbon dioxide

80) Which number indicates neutral on a pH scale? 80) _____
A) 1 B) 5 C) 7 D) 3 E) 9

81) Most organic compounds are made up of _____. 81) _____
A) nitrogen, oxygen, and carbon dioxide atoms
B) carbon, hydrogen, and oxygen atoms
C) carbon, hydrogen, and nitrogen atoms
D) carbon, nitrogen, and ozone atoms
E) carbon, nitrogen, and water atoms

82) The stratospheric ozone layer is important to ecosystems because it _____. 82) _____
A) absorbs and scatters UV light
B) keeps atmospheric gases balanced
C) keeps the temperature of Earth stable
D) ensures lakes and oceans do not lose water
E) provides the air we breathe

83) The most basic source of immediate energy for most organisms is _____. 83) _____
A) starches
B) amino acids
C) water
D) glucose
E) lipids

84) The pH scale is a quantitative representation of the relative amounts of _____. 84) _____
A) hydrogen and polar water molecules in solution
B) hydrogen and oxygen ions in solution
C) alkaline and basic ions in solution
D) hydrogen and hydroxyl ions in solution
E) water and carbon dioxide molecules in solution

85) Natural gas is primarily composed of _____. 85) _____
A) hydrogen
B) nitrogen
C) carbon dioxide
D) methane
E) oxygen

86) What is the primary structural constituent in plant tissues? 86) _____
A) protein
B) chlorophyll
C) enzymes
D) cellulose
E) starch

87) What is something that you use almost every day that is a polymer? 87) _____
A) water B) metal C) wood D) gas E) plastic

88) Energy is the _____. 88) _____
A) amount remaining to do work in the future
B) chemical bonds between atoms and molecules
C) work that has been done
D) capacity to do work
E) motion that moves things

89) The first law of thermodynamics states that _____. 89) _____
A) energy is always recycled in ecosystems
B) although energy can be transformed from one form to another, it cannot be created or destroyed in normal chemical reactions
C) energy is always degraded in a chemical reaction
D) all energy always has kinetic and potential characteristics
E) entropy always decreases in normal chemical reactions

90) Most ocean ridges coincide with _____. 90) _____
A) continental plates
B) oceanic plates
C) convergent plate boundaries
D) divergent plate boundaries
E) transforming boundaries

91) The energy of light is called electromagnetic radiation. In the electromagnetic spectrum, photosynthesis makes use of which specific wavelengths? 91) _____
A) infrared radiation
B) the entire electromagnetic spectrum
C) ultraviolet radiation
D) visible light
E) X-rays

92) Heat energy refers to the kinetic energy of molecules. Heat can move in a number of different ways: when warm air rises causing the gas or liquid to circulate, the process that is said to occur is _____. 92) _____
A) latent heat transfer
B) conduction
C) evaporation
D) radiation
E) convection

93) What are the three distinct layers of the earth? 93) _____
A) mantle, crust, oceanic crust
B) core, mantle, magma
C) mantle, magma, crust
D) core, mantle, crust
E) oceanic crust, mantle, magma

94) What makes up about 70% of the Earth's total volume, as it relates to the Earth's structure? 94) _____
A) oceanic crust
B) lithosphere
C) mantle
D) magma
E) crust

95) What parts of the Earth's crust float on top of the mantle? 95) _____
A) lithosphere
B) tectonic plates
C) ozone layer
D) stratosphere
E) oceans

96) The type of tectonic plate boundary at the Mid-Atlantic Ridge is referred to as a _____. 96) _____
A) transform fault
B) divergent boundary
C) seismic boundary
D) convergent boundary
E) subduction zone

97) The Earth's atmosphere is mostly composed of _____. 97) _____
A) nitrogen and oxygen
B) oxygen and carbon dioxide
C) water and oxygen
D) water and carbon dioxide
E) nitrogen and carbon dioxide

98) _____ is the tendency toward a disordered state. 98) _____
A) Heat
B) Convection
C) Kinetic energy
D) Potential energy
E) Entropy

99) _____ are synthesized in a two-step process: transcription and translation. 99) _____
A) Proteins
B) Carbohydrates
C) Nucleic acids
D) Genes
E) Lipids

100) Starch and cellulose are examples of _____. 100) _____
A) lipids
B) sterols
C) proteins
D) nucleic acids
E) carbohydrates

101) Light is a form of _____radiation. 101) _____
A) UV
B) gamma
C) electromagnetic
D) X-ray
E) infrared

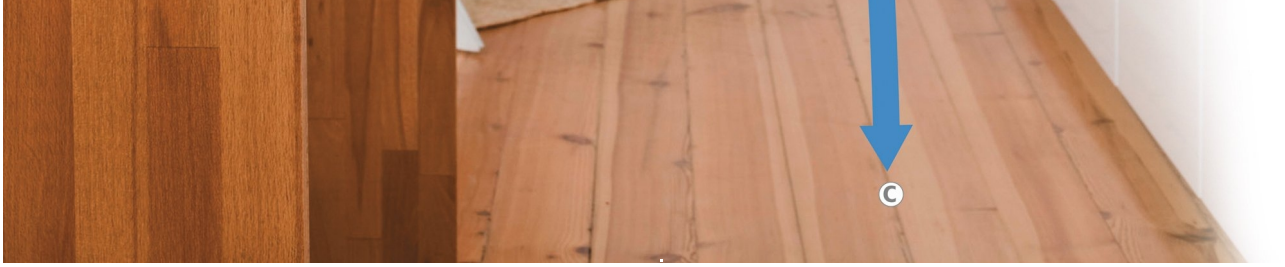
102) The unit that measures the amount of energy required to raise the temperature of 1 g of water 1°C is the _____. 102) _____

A) volt
B) joule
C) watt-hour
D) kilowatt-hour
E) calorie

103) The type of ocean current that is driven by differences in temperature and salinity is a _____ circulation. 103) _____

A) gyre
B) thermohaline
C) Hadley cell
D) Coriolis effect
E) Ferrel cell


A
B
C



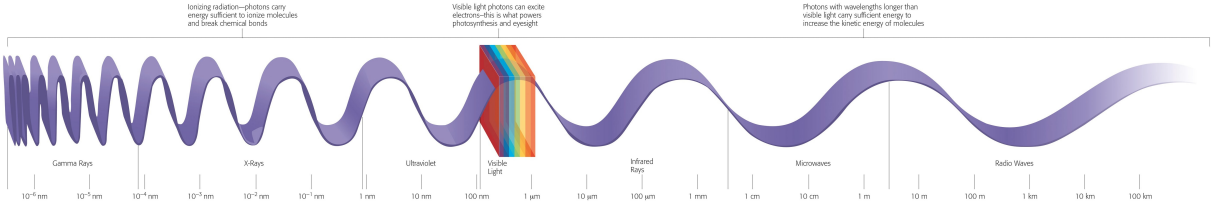
104) When the vase is sitting on top of the table, what type of energy exists? 104) _____

A) potential energy
B) kinetic energy
C) entropy
D) heat energy
E) work

105) When the vase falls to the floor, what happens to the energy in the system? 105) _____

A) The potential energy is converted into kinetic energy.
B) The potential energy causes the entropy in the system to change causing disorder.
C) The entropy within the system remains constant during the fall.
D) The kinetic energy is converted to heat energy that causes the vase to break.
E) The kinetic energy is converted into potential energy.

106) Which of the rays/waves along the wavelength contains the most energy? 106) _____



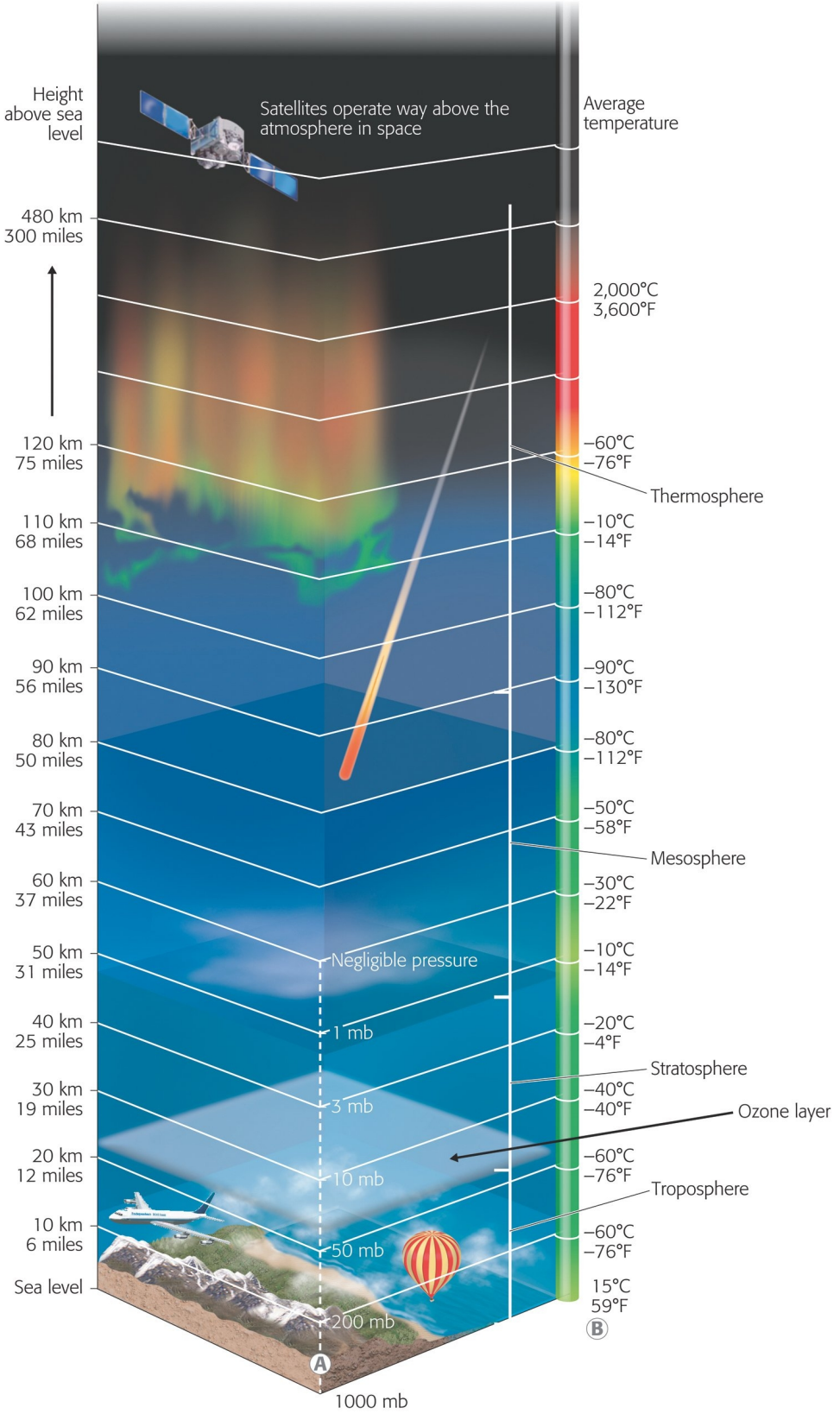
A) ultraviolet rays
B) microwaves
C) gamma rays
D) infrared rays
E) X-rays

107) Use the energy conversions table to determine how many joules (J) a 60-Watt light bulb uses in one hour. 107) _____

	Joules (J)	Calories (c)	Watt-hours (Wh)
A joule (J) =	1	0.24	0.00028
A calorie (c) =	4.18	1	0.0012
A watt-hour (Wh) =	3,600	861	1

A) 252,000 J B) 216,000 J C) 144,000 J D) 294,000 J E) 72,000 J

108) Where in the Earth's atmosphere are chemicals most likely to be dispersed and present for a long period of time? 108) _____



A) thermosphere
B) ozone layer
C) troposphere

D) stratosphere
E) mesosphere

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

109) Match each term with the correct description. 109) _____

I. Protons
II. Neutrons
III. Electrons
IV. Isotopes
V. Molecules

A. Negatively charged particles of the central nucleus of an atom
B. Electrically neutral particles of the central nucleus of an atom
C. Positively charged particles of the central nucleus of an atom
D. Two or more atoms held together by a chemical bond
E. Atoms of an element with different numbers of neutrons

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Read the accompanying scenario and answer the following questions.

The human body has the capacity to do work or engage in energy each day. Answer the following questions about the energy you have as you run a triathlon.

110) When you are resting at the top of a hill on a bicycle prior to racing down the hill you have _____ energy for movement. 110) _____
A) chemical
B) kinetic
C) potential
D) mechanical
E) nuclear

111) When the race begins and your body starts to move, the energy of _____ allows you to run and complete the race. 111) _____
A) work B) heat C) motion D) fission E) fusion

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

112) So far as we know, Earth is the only planet in our solar system that supports life. Describe/explain four major factors/characteristics unique to Earth, allowing for the evolution and support of life.

113) Describe how heat moves as you boil a pot of water to cook spaghetti for dinner.

1) C
2) C
3) B
4) A
5) E
6) E
7) D
8) B
9) A
10) B
11) A
12) C
13) E
14) B
15) E
16) E
17) C
18) A
19) A
20) A
21) C
22) E
23) D
24) B
25) D
26) A
27) A
28) A
29) B
30) I. B, II. C, III. E, IV. A, V. D
31) D
32) B
33) To be sustainable, actions must conform to the laws of mass and energy conservation. This is, something cannot be created from nothing, and everything goes somewhere. In order to manage a municipal water supply sustainably, one must understand the *rate of renewal* of the water source (is the source a mountain snowfield, constantly renewed, or is the source a more finite groundwater aquifer?). Secondly, one must have the ability and take the initiative to manage the *rate of use* of this water supply, based on changes in the area's population growth, also factoring in any new demands for this water supply with time (new land uses evolving, such as increased levels of agriculture).
34) One might begin with a focus on the ecosystem services that regulate climate (solar energy budget), the flow of water through ecosystems (water cycle), or the absorption of pollutants (microbial decomposition and the essential recycling of matter). One could also describe the basic ecosystem processes such as any of the nutrient cycles (N cycle, which provides the critical N-compounds to plants that humans consume in order to build their essential N-containing compounds of DNA/RNA, enzymes, and proteins). The carbon cycle, moving O_2 and CO_2 through the ecosystem via the processes of photosynthesis and cellular respiration could also be described.
35) B
36) E
37) B
38) A
39) A
40) A

41) E
42) A
43) E
44) E
45) B
46) B
47) C
48) C
49) D
50) C
51) D
52) A
53) C
54) C
55) C
56) E
57) B
58) A
59) C
60) B
61) B
62) E
63) C
64) E
65) D
66) I. B, II. C, III. D, IV. E, V. A
67) E
68) D
69) Ecological value can be measured by looking at ecological services provided by ecosystems and measuring the possible loss of services as a result of human impacts. Often these costs do not come into play until long after the ecosystem has been compromised or lost, and the services or actions that were supported by that ecosystem are now missing. For example, the ecological costs of the degradation of a forest are often not realized until reforestation of that land is required (because of extensive soil erosion, flooding, or siltation damage downstream) and undertaken.
70) The three main ethical approaches used to determine environmental value are anthropocentric, biocentric, and ecocentric views. Anthropocentric ethics assigns intrinsic value only to humans and defines right actions only in terms of positive outcomes for humans. The conservationist view of environmental management is an example of this human-centered approach. Biocentric ethics takes into consideration the value of other living things and values them equally with humans. This biocentric ethic is often articulated by those in the animal rights movement. Ecocentric ethics places value on communities of organisms and ecosystems, and is the most expansive and "big picture" approach to determining environmental value.
71) Individuals are often left to make their own decisions about how much they drive, how much energy they use, how much waste they generate, how much water is consumed. These things are hard to regulate from a governmental standpoint and are often regulated differently in each state and within each municipality. What is good for the government (a decrease in fossil fuel imports) is often not viewed as a positive for the individual (if it translates into less individual automobile use). Regarding a second issue, uncertainty and when to take definitive action on an environmental problem are debated for almost every environmental issue, especially early on. The precautionary principle approach says that when there is reasonable evidence that an action or policy may place human health or the environment at risk, precautionary measures should be taken, even if initial evidence seems inconclusive. This approach encapsulates the environmental debate over the global climate change issue, where energy companies might resist implementing controls over fossil fuel use, even though environmental change continues.

72) GDP is the total value of goods and services produced by the citizens of a country divided by its population size. It is a measure of a country's economic standing and is used by governments and international organizations for assigning financial aid and making loans to nations. Because some actions may increase a country's GDP but reduce its human and natural resources (overharvesting forests or fisheries), economists have more recently suggested an alternative measure of natural wealth, the genuine progress indicator (GPI). GPI is the GDP plus or minus the economic value of enhancements or degradations to the environment. For example, actions such as forest destruction would decrease a country's GPI, while implementing waste management protocols would improve sustainability and increase a country's GPI.
73) A
74) C
75) B
76) E
77) C
78) C
79) A
80) C
81) B
82) A
83) D
84) D
85) D
86) D
87) E
88) D
89) B
90) D
91) D
92) E
93) D
94) C
95) B
96) B
97) A
98) E
99) A
100) E
101) C
102) E
103) B
104) A
105) A
106) C
107) B
108) D
109) I. C, II. B, III. A, IV. E, V. D
110) C
111) C

112) The presence of water is often cited as the first critical factor, as all life we are familiar with requires water to live. The presence of water in a liquid state, especially in Earth's vast oceans, plays a central role in maintaining temperatures that support life, as these large liquid reservoirs help to moderate any extreme temperature fluctuations. Water vapor in the atmosphere also influences the extent of evaporation and precipitation, allowing water to cycle across the planet's surface.
A second critical factor is our unique distance from the sun (93 million miles). At this distance, the sun's energy and resulting temperature are not extreme, allowing organic compounds to form and life to flourish. A third critical factor was the evolution of photosynthetic organisms, which ultimately decreased the original concentrations of carbon dioxide and increased oxygen concentrations in the atmosphere, allowing a great diversity of life to evolve over the past 3.8 billion years. A fourth unique factor is the magnetic field arising from convection currents in the Earth's core and the Earth's rotation. This magnetic field deflects the lethal ionizing radiation from solar winds, to which other planets in our solar system are regularly subjected.

113) Heat moves in four ways, conduction, convection, radiation, and latent. When water is boiling the source of conduction is the gas or electricity on the stove, it provides the heat that will help to allow the molecules of water to boil. Convection happens as the warm regions in the water become less dense and begin to rise, causing the boiling to begin. Radiation releases electromagnetic energy that is felt from the heat source and latent heat transfer occurs as the water evaporates as it boils, giving of steam that we might see.